Homework # 5, Stat 526

1. The data reports the applicants to graduate school at the University of California at Berkeley, for the fall 1973 session. Admissions decisions are presented by gender of applicant, for the six largest graduate departments. Denote the three variables by A=whether admitted, G=gender, and D=departmet.

   (a) Define the partial odds ratio to be the odds ratio for the admission between male and female given each department and the marginal odds ratio to be the odds ratio for the admission between male and female based on the sum of all the departments. Compute all the six partial odds raio and the marginal odds ratio and test the significance. Explain those odds ratios.

   (b) Fit a saturated log-linear model and test the significance of all the main effects and interaction effects. Explain all the significant interaction effects. *Note:* Use department F as the baseline in you R program by "relevel" command.

   (c) Exclude department A from your analysis. Develop the best log-linear model you can. Explain this model.

   (d) Explain the inconsistence of the significant different possibilities of admitted between male and female applicants in (a).

2. The data refers to the effect of academic achievement on self-esteem among black and white college students.

   (a) Test the significance of all the main effects and interaction effects

   (b) Develop a good log-linear model. Explain the interaction-effect related to self-esteem. If high order interaction effect is in the model. Then all the lower order term should be included in your model.

   (c) Develop a logit model which can adequately describes the data by treating self-esteem as a response variable. Interpret your model.

3. The data gives the expected frequencies for whether a boy scout (B), delinquency (D), and socioeconomic status (S).

   (a) Which log-linear model describes these expected frequencies. How can you say about the relationship between boy scout and deliquency.

   (b) Construct the marginal B-D table by summation to socioeconomic status. What can you say about this table.